



Electrical Power and Machines Department



TANTA UNIVERSITY

Faculty Of Engineering

MID-TERM EXAM 2013/2014

Course	Energy Conversion (EPM2106)	Time	60 minutes
Students	2nd Year (Electrical Power and Machines)	Mark	30

Answer ALL the following questions:

- Clarify your answer with the suitable sketches as you can.
- Assume any missed data reasonably.

The first question (5 marks)

Choose the correct answer/answers for the following statements. It is sufficient to write down the question number followed by your choice/choices in your answer sheet:

1.	Nonlinear magnetic characteristics leads to: A) distorted magnetizing current B) higher power loss	C) higher inductance D) inducing an emf
2.	Two magnetically coupled coils have self inductances of L_{11} and L_{22} . The value of the mutual inductance M <u>may take a value</u> which is: A) less than the smaller self inductance B) between values of L_{11} and L_{22}	C) higher than the larger self inductance D) of any positive value
3.	For mutually coupled coils, if currents are both entering at the dot-marked terminals, coil fluxes A) are additive B) increase	C) are subtractive D) cancel each other
4.	For dc excitation, induced emf is A) only speed voltage B) both speed and transformer voltages	C) only transformer voltage D) always zero.
5.	A two-phase winding excited from a two-phase gives A) a single rotating mmf B) stationary mmf	C) two rotating mmfs with anti-direction D) Pulsating mmf.

The second question (5 marks)

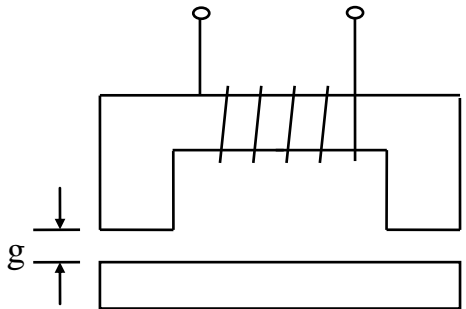
Which of the following statements is correct? You can write down in your answer sheet the question number followed by either \checkmark or X mark.

1.	Core losses depend on area of hysteresis loop of the magnetic material.
2.	Motional (speed) voltage increases with increasing supply frequency
3.	Inductance of a coil increases with increase in magnetic reluctance of its core.
4.	For a linear magnetic system, coil inductance does not depend on its current
5.	Distribution factor is used to eliminate the effect of high field harmonics

The third question (10 marks)

1.	With the aid of BH curve of a permanent magnet material show: a) the effect of air gap length on the position of the operation point b) the point of maximum energy product	(2 marks)
2.	Show the MMF space distribution a dc-excited coil of uniform air gap, if the conductors are : a) concentrated b) distributed in 8 slots (4 in each side). Which of the two cases are preferred? Why?	(4 marks)
3.	Define what is meant by transformer and rotational voltages.	(4 marks)

The fourth question (10 marks)

1.	A 1250 KVA, 3.3 KV, 50 Hz, 300 rpm, three-phase star connected generator has 180 slots and 5 conductors per slot having single layer winding with full pitch coils and one circuit per phase. Determine the specific electrical and the specific magnetic loadings if the inner diameter of alternator is 2.2 m and axial length is 0.5 m.	(5 marks)
2.	<p>The lifting magnetic system shown in figure has a square cross-section of 25 cm^2. The coil has 300 turns and a resistance of 10Ω. The air-gap is held at 5 mm and a dc source of 120 V is connected to the coil. Determine:</p> <ol style="list-style-type: none"> 1. The flux density in the air gap. 2. The energy stored in the magnetic field. <p>Neglect reluctance of the magnetic core and field fringing in the two air-gaps</p>	 <p>(5 marks)</p>

Good Luck and best wishes
 Prof. Essam Eddin M. Rashad
 Dr. Abd Elwahab hassan